

Modeling and Analysis of T Beam Deck Type and T Beam Pre-stressed Deck Bridge using FEM Method by STAAD PRO Software

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ABSTRACT

A Bridge is a structure built to span physical obstacles without closing the way underneath such as a body of water, valley, or road, for the purpose of providing passage over the obstacle. K is the portion of a bridge that acts as the roadway in the support of vehicular or pedestrian traffic. While deck parts like trusses, girders, rails, arches, posts and cantilevers assume a number of forms and types, there are relatively few bridge deck types given the utilitarian nature of the component.

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INTRODUCTION PRETENSIONING

Pretensioning provided another way to prestress the concrete. In Pretensioning, the concrete is poured around the already-tensioned cables and allowed to harden and hold the cables in place. When the concrete is solid and cured, the ends of the tensioned cables are cut and the tension is released into the beam or slab. All prestressed bridge beams today are made with the pretensioning process, which is more complicated than the post-tensioning process. Pretensioning requires the construction of large "casting beds" to hold the steel cables, called

"strands," in a highly tensioned state while the concrete is poured around them in molds.

OBJECTIVES

- Comparative study on T beams Deck type and on T beam Pre-stressed deck type.

METHODOLOG

In this study, I am focusing the analysis using finite element method using analysis tool STAAD PRO, which is capable of applying all conditions and methods with respect to preferred standard code.

RESULTS

➤ **Graphs Shows Comparison of Displacement for T Beam Ordinary Deck and T Beam Ordinary Deck Prestress**

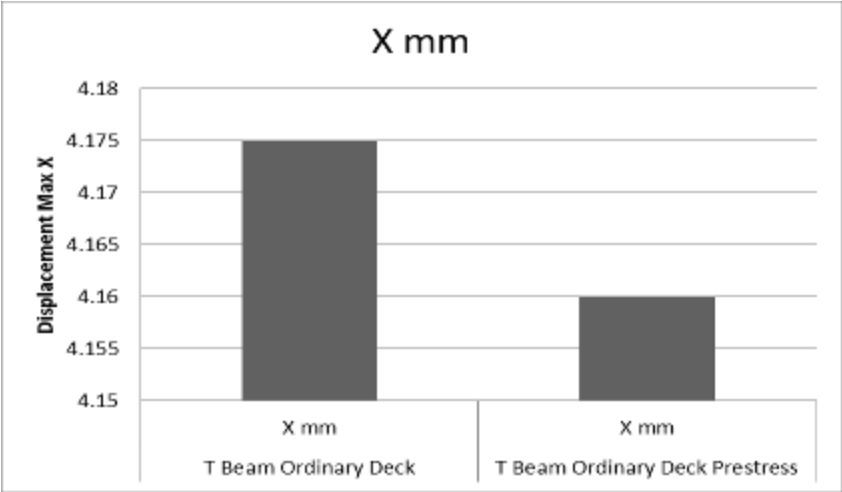


Fig. 1: Max. Displacement in X Direction

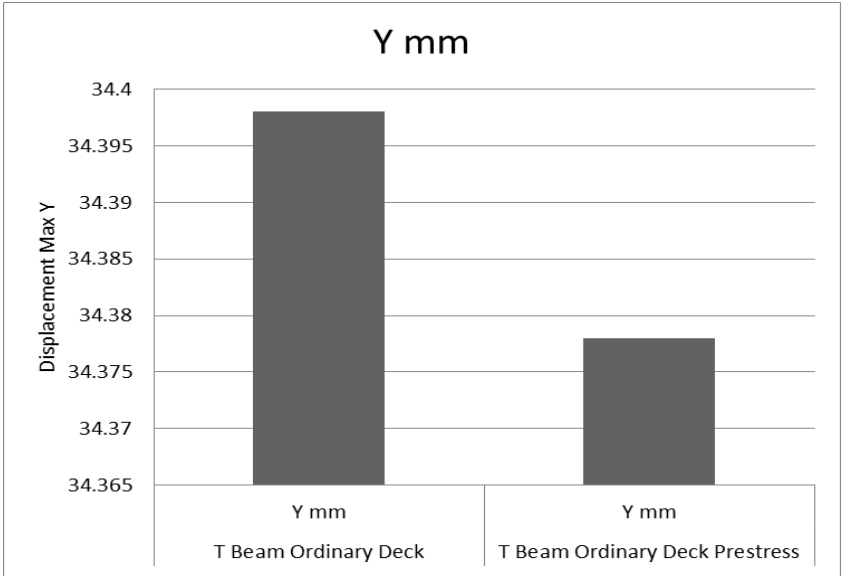


Fig. 2: Max. Displacement in Y Direction

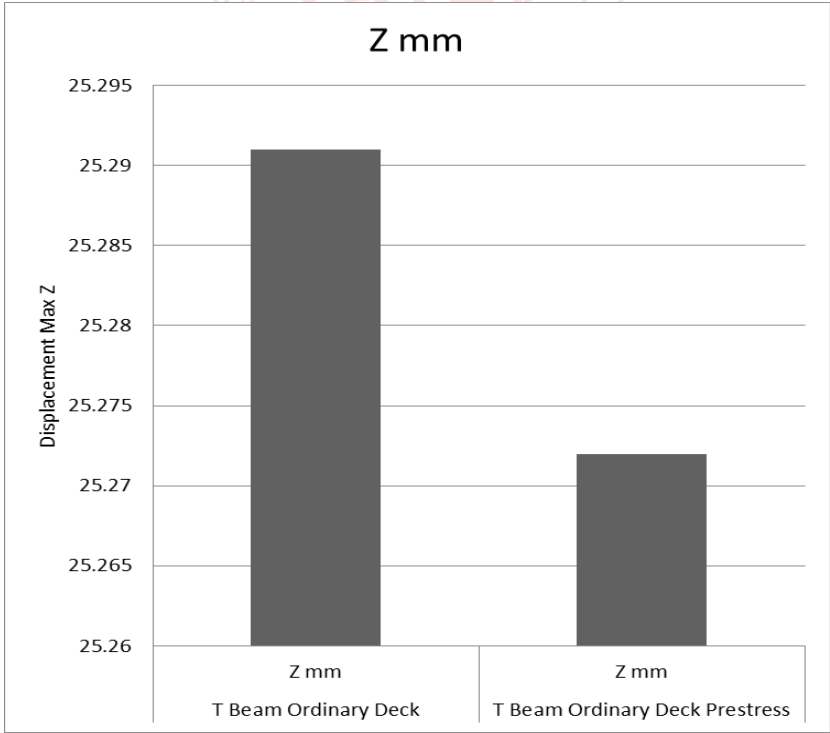


Fig. 3: Max. Displacement in Z Direction

Max Forces and Moment

➤ Graphs Shows Comparison of Forces and Moment for T Beam Deck and T Beam Deck

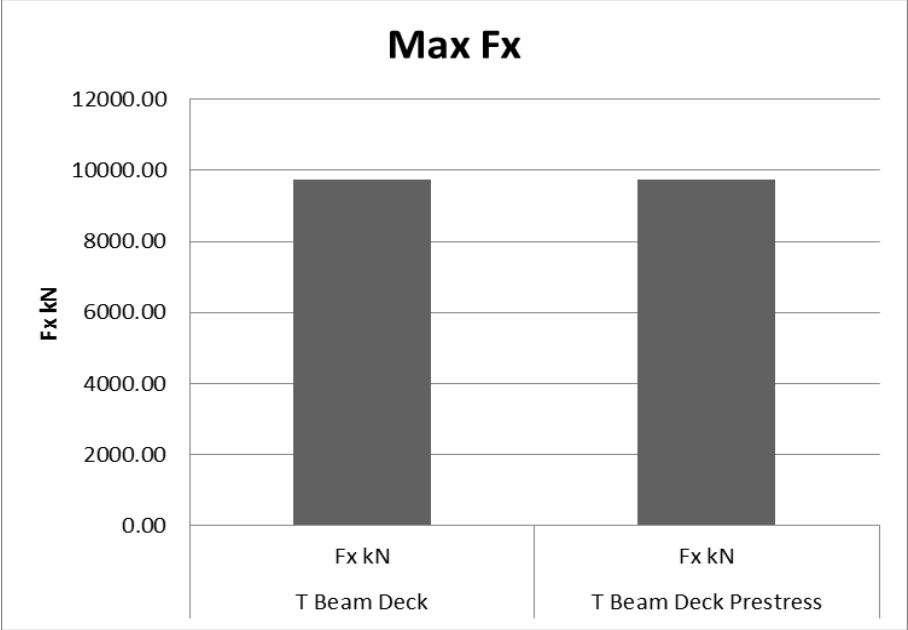


Fig 4: Max. Force in X Direction

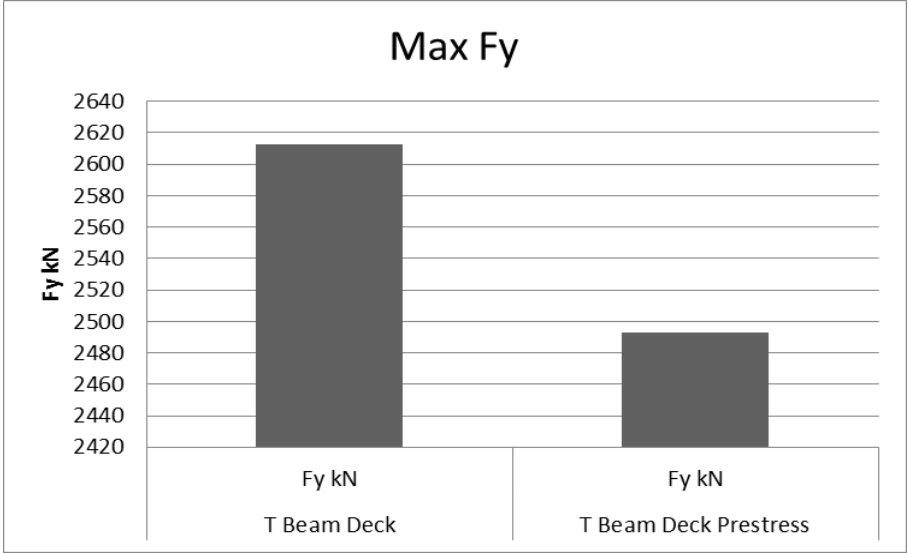


Fig5: Max. Force in Y Direction

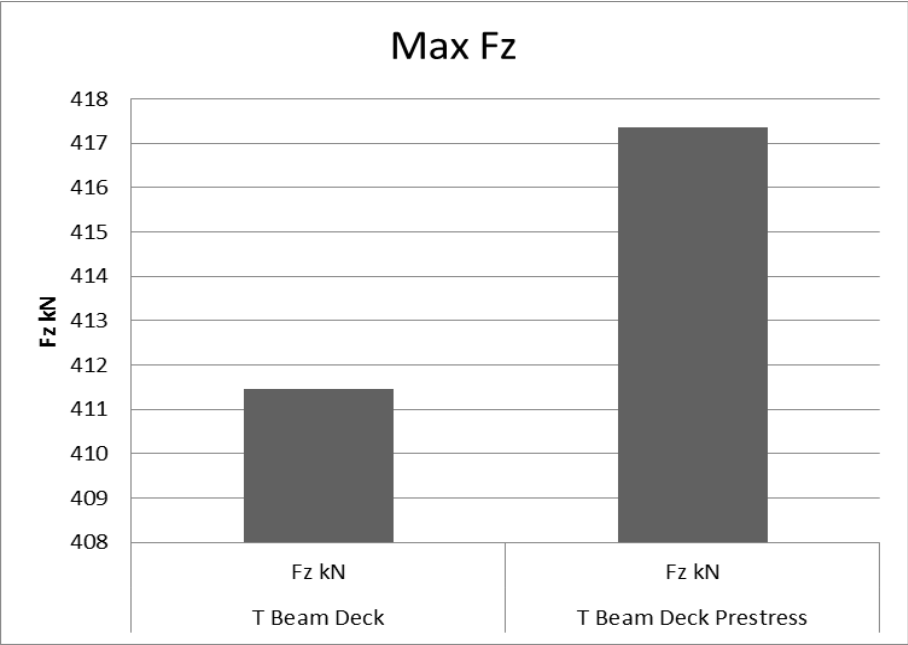


Fig6: Max. Force in Z Direction

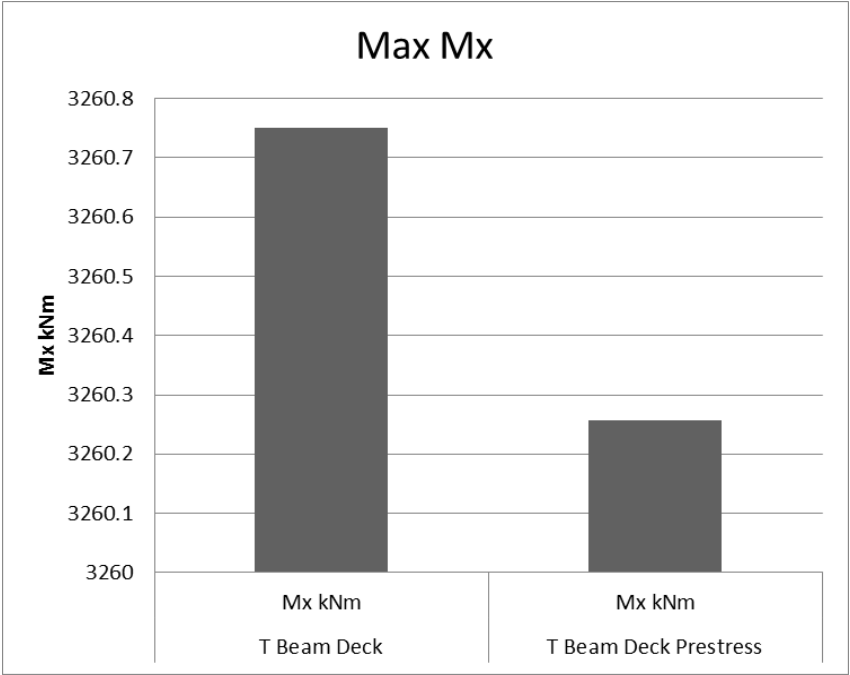


Fig7: Max. Bending Moment in X Direction

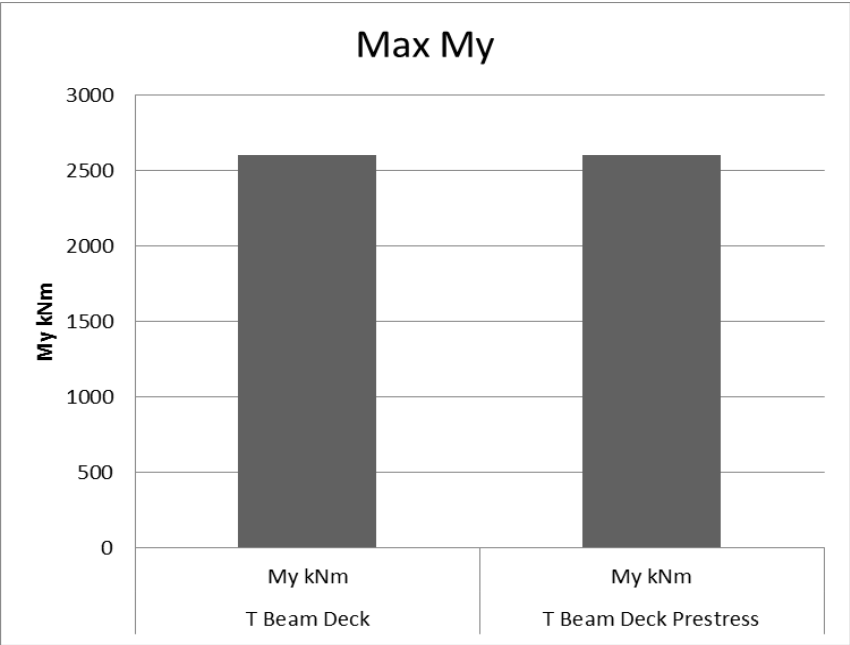


Fig. 8: Max. Bending Moment in Y Direction

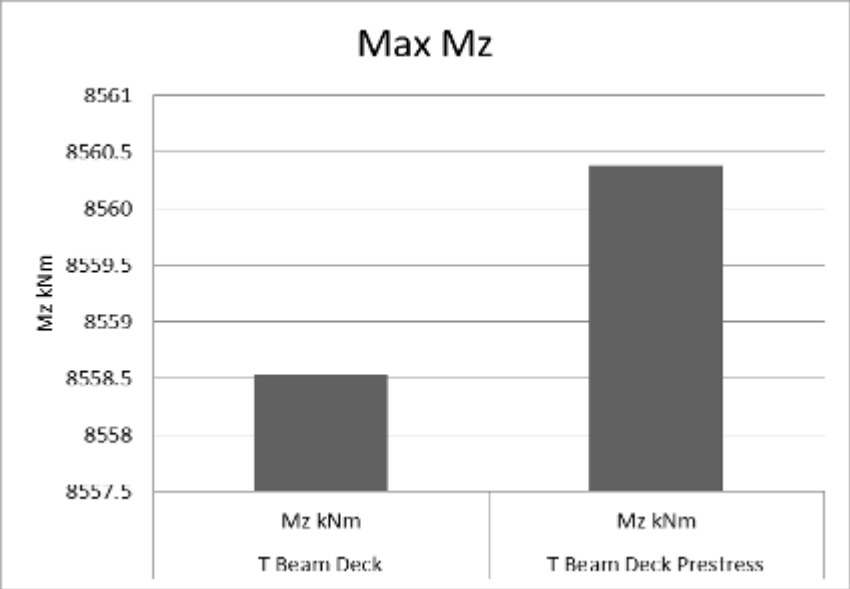


Fig. 9: Max. Bending Moment in Z Direction

CONCLUSION

- T Beam Prestress Deck shows least bending moment in all conditions i.e. 3260.751 Kn-m, 2602.017 Kn-m, 8558.537 Kn-m in X, Y & Z directions in comparison to T Beam Deck.
- T beam deck variations in terms of forces, moments & displacements, in comparison with T Beam Prestress Deck shown better result.

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